SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Sc.(Maths) END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - VI
08UMACT6014 - Complex Analysis

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. State and prove the sufficient condition for the existence of the derivative of f at any point.
2. Derive Cauchy Riemann equation in Polar form.
3. Write Short notes on Contours.
4. State and prove Liouville's theorem.
5. State and prove fundamental theorem of Algebra.
6. Find the nature of singularity for the following functions.
   a. $\frac{3}{z-1} + 4 + 5(z-1) + 6(z-1)^2$ at $z = 1$
   b. $\frac{e^z}{z^2}$ at $z = 0$
   c. $e^{1/z} + 1 + z + z^2$ at $z = 0$
7. Find the residue of $1/z(e^z$-1) at z=0
8. Discuss the transformation $w = z^{1/2}$

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Derive Cauchy - Riemann Equations.
10. State and prove Cauchy integral formula.
11. Expand $1/(z-1)(z-2)$ as a power series in z valid in
    a. $|z| < 1$
    b. $1 < |z| < 2$
    c. $|z| > 2$
12. State and prove Cauchy's Residue theorem.
13. Show that the transformation $w = 1/z$ transforms circles and straight lines in the z plane into circles and straight lines in the w plane

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